



Patent Application  
Docket No. USF-T156X  
Serial No. 10/073,065

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner : Myron G. Hill  
Art Unit : 1648  
Applicants : Shyam Mohapatra, Mukesh Kumar, Shau-Ku Huang, Kam W. Leong  
Serial No. : 10/073,065  
Filed : February 12, 2002  
For : Gene Expression Vaccine

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION OF SHYAM S. MOHAPATRA, Ph.D., UNDER 37 C.F.R. §1.132

Sir:

I, Shyam S. Mohapatra, Ph.D., of the University of South Florida, hereby declare:

THAT, my *curriculum vitae* is attached hereto as Exhibit A;

THAT, I am a named inventor on the above-referenced patent application (hereinafter referred to as "the patent application");

THAT, through my years of research, I have kept up to date on the technical literature and maintained contact with experts in the field by participating in professional meetings and seminars, and by direct personal contact. As a result, I am familiar with the general level of skill of those working in the fields of prophylactic and therapeutic modulation of inflammation, particularly with respect to upper and lower airway diseases, including allergen and/or respiratory syncytial virus (RSV)-induced asthma;

THAT, I have read and understood the specification and claims of the patent application, the Office Actions dated October 21, 2003, April 5, 2004, November 16, 2004, and August 10, 2005, and the references cited in the foregoing Office Actions;

AND, being thus duly qualified, do further declare:

1. Claim 33 has been rejected under 35 U.S.C. §103(a) as being obvious over Connors *et al.* (*J. Virol.*, 1991, 65(3):1634-1637) in view of Li *et al.* (*J. Exp. Med.*, 1998, 188(4):681-688) and Li *et al.* (*Virology*, 2000, 269:54-65), and further in view of Leong (*J. Controlled Release*, 1998, 53:183-193). In addition, claim 50 has been rejected under 35 U.S.C. §103(a) as being obvious over Connors *et al.* in view of Li *et al.* (1998) and Li *et al.* (2000) and Leong, and further in view of Illum (WO 90/09780) or Rolland *et al.* (U.S. 6,184,037) or Wyatt (*Vaccine*, 1999, 18:392).

2. RSV is the most common cause of viral lower respiratory tract infections in infants and children, affecting approximately 4 million children globally and being responsible for about 100,000 hospitalizations and 4500 deaths per annum in the United States alone (Centers for Disease Control and Prevention, 1999, Update: Respiratory syncytial virus activity—United States, 1998-1999 season). Acute RSV infection is associated with episodes of bronchiolitis (inflammation of the bronchioles (small airways)), which causes wheezing and pneumonia among infants and children under 1 year of age (Chanock *et al.*, *Pediatrics*, 1992, 90:137-143). Treatments for severe lower respiratory tract infection caused by RSV remain elusive. Safe and effective immunizations to prevent RSV infection are not yet available. Only the F and G RSV antigens have been shown to induce neutralizing antibodies against RSV (Connors *et al.*, 1991; Wyatt *et al.*, *Vaccine*, 1999, 18:392-397). N, F, P, M2, and NS2 proteins have been target antigens of cytotoxic T lymphocyte (CTL) activity in humans (Nicholas *et al.*, *J. Virol.*, 1990, 64:4232-4241). However, injections of the humanized anti-RSV-F monoclonal antibody, palivisumab, has led to reductions in the incidence of severe RSV disease in high-risk infants (Kneyber *et al.*, *Eur. J. Pediatr.*, 2000, 18:558-567). Palivisumab is now the standard of care for high-risk infants during RSV season. Routine use of palivisumab in these patients has led to impressive reductions in RSV-related hospitalizations, but there is still room for improvement. Monthly administration of passive antibody is cumbersome, expensive, and only partially effective.

3. Despite decades of intense research, a safe and effective RSV vaccine that can be given to infants has eluded investigators. Perhaps the single most important concern is that

vaccination may actually exacerbate naturally occurring RSV infection, a phenomenon witnessed when a formalin-inactivated RSV vaccine was administered to infants and children during the 1960s (Chanock *et al.*, 1992; Kapikian *et al.*, *Am. J. Epidemiol.*, 1969, 89:405-421; Kim *et al.*, *Am. J. Epidemiol.*, 1969, 89:422-434; Chin *et al.*, *Am. J. Epidemiol.*, 1969, 89:449-463; Openshaw *et al.*, *Vaccine*, 2002, 20:S27-S31). Another obstacle to the development of a vaccine is that RSV infection itself, even in its most severe form, elicits incomplete immunoprotection.

4. It is intuitive that treatment of serious viral bronchiolitis should start with agents that interfere with virus replication. One antiviral compound, ribavirin, has potent anti-RSV activity and enjoys an FDA-approved indication for treatment of hospitalized infants with RSV bronchiolitis. However, as the clinical experience of pediatricians indicated that ribavirin therapy did not result in significant improvement of their patients, its routine use for treatment of RSV infection came to a halt. Because ribavirin has potent anti-RSV activity, it was logical to assume that its use would be beneficial for patients with RSV-related bronchiolitis. Why is not effective? The pathogenesis of bronchiolitis depends on two co-existing events, which may not be easy to separate from one another. First, the virus attaches to and invades the respiratory epithelial cell, which serves as the host for viral replication. The virus then spreads to adjacent areas by lysis or by fusing with neighboring cells. Second, the respiratory epithelial cells respond by releasing a repertoire of pro-inflammatory mediators that serve to recruit inflammatory cells important in controlling the viral infection (see, for example, Piedra, P.A., *Pediatr. Infect. Dis. J.*, 2003, 22:S94-S99). This inflammatory response can be robust and difficult to control once initiated. The virus-driven inflammation has gained recent attention as a new target for intervention (see, for example, page S95, second column, second full paragraph of Piedra, 2003; and page 541, second column, first full paragraph, pages 544-545, and page 546, first two paragraphs of Openshaw and Tregoning, *Clinical Microbiology*, 2005, 18:541-555). If virus replication can be controlled with antiviral medications, for example, while at the same time the virus-induced inflammatory cascade can be fine-tuned, clinical improvement is expected. Thus, a successful RSV intervention should inhibit virus replication and protect against or minimize the inflammation associated with RSV infection.

5. Our invention utilizes a gene transfer strategy involving chitosan-DNA nanospheres containing a cocktail of plasmid DNAs (pDNAs) encoding nine immunogenic RSV antigens. The chitosan-DNA nanospheres are the subject of the claims in the patent application. The Kumar *et al.* publication (*Human Gene Therapy*, 2002, 13:1415-1425) describes an *in vivo* study evaluating the chitosan-DNA nanospheres of the invention as an effective and safe prophylaxis against RSV. The nanospheres were administered intranasally into the mouse lung. A single administration of nanospheres (25 µg of total DNA per mouse) induced expression of the mRNA and proteins for all nine RSV antigens in the lung and resulted in a significant reduction of viral titers and viral antigen load after acute RSV infection of these mice. The therapy also induced the production of anti-RSV antibody with neutralizing properties, enhanced interferon-gamma production in spleen and lung, and generated cytotoxic T lymphocyte responses against RSV. Importantly, this gene expression therapy also reduced RSV-induced lung inflammation. Lung inflammation was examined in different groups of mice. As shown at page 1420 of Kumar *et al.*, mice treated with chitosan alone (Figure 3A), chitosan plus the empty expression vector, pVAX (Figure 3C), naked DNA (Figure 3B), or PBS on acute RSV infection exhibit disruption of the epithelium and cellular infiltration. Representative pathological features reveal that groups of mice receiving the nanospheres of the invention exhibit less epithelial damage and reduced mononuclear cell and polymorphonuclear cell infiltrates in the interstitial and peribronchovascular regions (Figure 3D), as compared with controls (Figures 3A-3C). The arrows indicate epithelial damage and cellular infiltration. A semiquantitative analysis using a scoring system for inflammation in the lung is shown in Table 2 at page 1421 of Kumar *et al.* The scores for epithelial damage, interstitial-alveolar infiltrate, and peribronchovascular infiltrate are significantly lower ( $p < 0.001$  to  $p < 0.05$ ) for mice that received the nanospheres, compared with controls. These results are strong evidence that the nanospheres provide protection from RSV infection-induced pulmonary inflammation. The immunologic mechanisms for the effectiveness of the nanospheres' prophylaxis include the induction of high levels of both serum IgG and mucosal IgA antibodies, the generation of an effective CTL response, and elevated lung-specific production

of IFN-gamma with antiviral action. Importantly, the nanospheres also decrease pulmonary inflammation and do not alter airway hyperresponsiveness, making them a safe vaccine against RSV.

6. The robust anti-inflammatory activity exhibited by the nanospheres of the invention is unexpected based on the references cited in the Office Action, and is particularly advantageous for RSV intervention for the reasons discussed above. The Li *et al.* publication evaluates pulmonary inflammation of mice immunized with plasmids encoding the RSV F protein (pXL2) intramuscularly (i.m.) and intradermally (i.d.) after RSV challenge. Results were compared with that of mice administered with RSV (intranasally), formalin-inactivated RSV (FI-RSV) (i.m.), and empty vector (pXL0) (i.m.). As shown in Table 3 at page 686, mice immunized with the pXL0 control had a mild pulmonary inflammatory reaction (135 +/- 0.60) compared with pXL2, RSV and FI-RSV. In fact, mice immunized with pXL2 had a significantly more intense inflammation of the bronchioles than the control (pXL0) and RSV itself.

7. The Leong *et al.* publication is cited in the Office Action for showing that coacervation with chitosan can improve delivery of plasmid DNA into cells. However, most of the informative data in the Leong *et al.* publication pertains to DNA complexed with gelatin, instead of chitosan. The data presented in the Leong *et al.* publication show that gelatin and chitosan perform differently as gene delivery vehicles. For example, Figure 5 at page 188 of Leong *et al.* demonstrates that luciferase transfection of 293 cells with DNA-gelatin nanospheres resulted in a transfection efficiency that was clearly dose-responsive. This transfection efficiency was not evident in the DNA-chitosan nanospheres. Both nanospheres were less effective than lipofectamine. The HEK293 cells used in these studies represent an easily transfectable cell line and studies using this cell line are not reflective of other lung epithelial cell lines, such as lung alveolar type-2 A549 epithelial cells and normal bronchial epithelial cells, which are relevant to RSV. Differences in transfectability among cell lines, which was observed in the Leong *et al.* publication, are common place in *in vitro* transfection studies. Figure 7 in the Leong *et al.* publication shows intracellular distribution of DNA-gelatin nanospheres, not DNA-chitosan nanospheres. Indeed, it should be noted that the

penultimate paragraph at page 192 of the Leong *et al.* publication indicates that "these data suggest that the DNA-chitosan nanospheres might be entering the cells through a mechanism different from that used by the DNA-gelatin nanospheres". The last paragraph at page 192 of the Leong *et al.* publication references a citation reporting successful delivery of the CFTR gene to rabbit lung airways but this citation [24] pertains to gelatin nanospheres. Likewise, the last sentence references citation [25] as suggesting that the DNA-nanospheres "might be attractive vehicles for DNA vaccine applications". This citation also pertains to gelatin nanospheres.

8. The effectiveness of the nanospheres of the invention, particularly with respect to their ability to decrease RSV-induced pulmonary inflammation, is unexpected in view of the cited references.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or of any patent issuing thereon.

Further declarant sayeth naught.

Signed:



Shyam S. Mohapatra, Ph.D.

Date:

2/9/06

# EXHIBIT A

## Curriculum Vitae

Shyam S. Mohapatra, PhD  
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Tampa, FL 33647  
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### **USF Affiliation:**

Professor and Director of Basic Research,  
Division of Allergy and Immunology and the Joy McCann Culverhouse Airway Disease Center,  
Department of Internal Medicine, Univ. of South Florida College of Medicine,  
12901 Bruce B. Downs Blvd, Tampa, FL 33612,  
Ph: (813) 974 -8568, Fax: (253) 276-7470, Email: [smohapat@hsc.usf.edu](mailto:smohapat@hsc.usf.edu)  
Joint Appointments with: Department of Medical Microbiology and Immunology (1997-), COM  
Department of Biochemistry and Molecular Biology (2002-), COM  
Department of Pediatrics, COM, and  
Department of Environmental and Occupational Health, COPH

### **VA Affiliation:**

Molecular Biologist & Principal Investigator, Medical Service, James A Haley VA Medical Center,  
13000 Bruce B Downs Blvd, 13000 Bruce B Downs Blvd, Tampa, FL 33612  
Ph: (813) 972 -7631, Fax: (813) 972- 7623

### **Moffitt Affiliation:**

1997: Member of H. Lee Moffitt Cancer Center and Research Institute  
2002: Member of Moffitt Cancer Biology PhD program

### **Education and professional training:**

1976	BS, Orissa Univ of Agril and Technology, Bhubaneswar, India
1978	MS, GB Pant Univ of Agril & Technology, Pantnagar, India
1984	Ph.D. (Genetics) Australian National University, Canberra
1984-85	Alexander Von Humboldt Research Fellow, Genetics, Univ. of Bielefeld, Germany
1986-87	Research Associate, Biology, McGill University, Montreal
1993	Visiting Scientist, Immunology, Mayo Clinic, Rochester, MN
1993	Visiting Professor, Allergy & Clinical Immunology, University of Florence, Italy
1999	MBA, University of South Florida

### **Faculty Positions held:**

1988-91	Assistant Professor, Immunology, University of Manitoba, Winnipeg
1992-95	Associate Professor (with tenure), Immunology, University of Manitoba, Winnipeg
1996-99	Associate Professor, Internal Medicine, University of South Florida, Tampa
1996-99	Associate Professor, Medical Microbiology & Immunology, Univ. of South Florida,
1997-	Director of Basic Research, J.M. Culverhouse Airway Disease Research Center.
2000-	Professor of Internal Medicine, University of South Florida College of Medicine.

### **Specialization (specify)**



- (i) Main field: Immunology and Inflammation, Molecular biology of viral infection  
Molecular Biology and Genetics of IgE responsiveness, and
- (ii) Current research interests:
  - Molecular mechanisms of virus infection
  - Development of prophylactic/therapeutic gene transfer
  - Development of Genetic antivirals
  - Molecular basis of genetic predisposition to inflammatory diseases.
  - Development of nanotechnology and its application to diagnosis and therapy
- (iii) Technical discipline: Molecular biology, cell biology, immunology, microbiology, gene therapy, nanotechnology

### **Honors, Awards, Fellowships:**

- 1980-83 - ANU Post-Graduate International Research Award, tenable in the Australian National University, Canberra for Ph.D. research, 1980-83.
- 1984-85 - Alexander von Humboldt (AvH) Research Award, AvH Foundation, Bonn, Germany
- 1988 - St. Boniface Research Foundation Scholarship, (Declined)
- 1988-91 - Research Scholar, Manitoba Health Research Council, Winnipeg
- 1989 - Canadian Society of Immunology Travel Award
- 1992 - Univ. of Manitoba Merit Award for excellence in research and creative activities
- 1992 - Pharmacia Allergy Research Foundation Award, Paris, for excellence in research on IgE mediated reactions. *[A major International Award in the field of Allergy]*
- 1993 - Medical Research Council (MRC) Visiting Scientist Award.
- 1993 - Named to the World Health Organization Expert Panel on Recombinant Allergens, Geneva.
- 1997 - Research and Creative Scholarship Award, University of South Florida.
- 1997 - Presidential Honored Research Faculty Recognition, University of South Florida.
- 1997 - *Ad hoc* Member of the NIH-NIAID Scientific Review Panel, on AIDS, vaccines and Immunology of Aging, June, 1997.
- 1998 - Member of the American Lung Association Research Grant review Committee.
- 1998 - American Lung Association of Florida Career Development Award.
- 1999 - American Heart Association, Florida Affiliate, Research Grant Award, 1999-2001.
- 1999 - Veteran Administration Merit Review Award, 1999-2004.
- 2000 - Member, INTERNATIONAL WHO' S WHO Association, NC.
- 2000 - Named with biography in the distinguished AMERICAN WHO's WHO, 2001 Edition.
- 2000 - Member of American Thoracic Society Advisory Board on Education.
- 2002 - Editor-in-chief of the online Journal: "Genetic Vaccines and Therapy."
- 2003: - Member, NIH Study Section (SEP on ancl Asthma and Allergic Diseases Research Centers: innate immunity, bioterrorism.)
- 2004: - Outstanding Biotechnology Recognition Award, University of South Florida, Health Science Center.
- 2004: - Chairman of NIH Study Section (SEP on Signaling of the Immune System).
- 2004: - Co-founded a start-up biotech Company: TransGenex Nanobiotech, Inc, Tampa
- 2004: - Chairman, Scientific Advisory Board of TransGenex Nanobiotech Inc, Tampa
- 2005: - Outstanding Biotech Achievement Award, University of South Florida- Health Science Center, Tampa.
- 2005: - Sigma Xi 2004-05 Outstanding Faculty Researcher Award, Tampa Bay Chapter,

- Tampa.
- 2005: - Univ South Florida Outstanding Faculty Research Achievement Award, Tampa.
- 2005: - Member, NIH Study Section (SEP on NCI's Nanotechnology Platforms for Cancer).
- 2005: - Member, NIH Study Section (SEP on NIAID "Leadership in Clinical trials for HIV/AIDs).
- 2006: - Member, Advisory Board, NIPER-NANO-2006 Conference - Nanotechnology in Advanced Drug Delivery, National Institute Pharmaceutical Education and Research, Chandigarh, India, Feb 17-18, 2006  
(<http://www.geocities.com/nanotechnologydrugdelivery>)
- 2006-2008 Co-Chair/Chair for American Heart Association Scientific Review Panel.

***Membership of Honored /Professional Societies:***

- 1988-95 - Member, Canadian Society of Immunology
- 1990-95 - Member, Canadian Society of Allergy and Immunology
- Member, European Academy of Allergology and clinical Immunology
- 1992- - Member, Pharmacia Allergy Research Foundation, Uppsala, Sweden
- 1992- - Member, American Association of Immunologists
- 1993- - Member, American Academy of Allergy and Clinical Immunology
- 1998- - Elected as Fellow of the American Academy of Allergy, Asthma and Clinical Immunology
- 1998- - Elected as Honorary Member of the Mexican Society of Allergy and Immunology
- 1999- - Member, American Thoracic Society.

***Membership of Committees/Review Panels:***

- 2005 - Member, Am Thoracic Society AAI Program Committee
- 2004 - AAAAI Workshop Representative for MAAI Interest Section
- 2004 - AAAAI Workshop Committee Vice Representative, MAAI Interest Section
- 2004 - Member, Protocol Committee, Am.Lung Assoc-Asthma Clin Res Center Network,
- 2002 - NIH Study section-Centers of Excellence on allergy and asthma.
- 2001- Member of Scientific Review Panel, American Heart Association, Southern Cons.
- 1998- Member of Scientific Review Panel, American Lung Association, NY
- 1999- Member of the Cells & Cytokine Committee, Am. Acad Allergy, Asthma and Immunology
- 1998- Molecular Biology and Genetics Committee, American Academy of Allergy Asthma, and Immunology
- 1998: Member of the Molecular Biology and Genetics Committee, American Academy of Allergy Asthma, and Immunology.
- 1997: Member of Interview Committee for admission of Medicine Students, USF Faculty of Medicine,
- 1997: Member of Review Panel for Student Research, USF Faculty of Medicine,
- 1993-95: Member of Operating Grants Panel of the Manitoba Health Research Council, Winnipeg, Canada.
- 1994: Member of Faculty of Medicine Research Awards Committee, College of Medicine, Univ. Manitoba
- 1994: Member of the International Scientific Board, 5th Int. Symp. of Aerobiology,

- Bangalore, India
- 1993: Member of the Cytokine committee, American Academy of Allergy and Immunology.
- 1993: Member of World Health Organization Expert Panel on Recombinant Allergens and Epitopes, Geneva, Feb 22-24.
- 1990-93: Member, Interview Committee for the Admission of Students to the Undergraduate Program, Faculty of Medicine,
- 1992: Member of the IUIS/WHO Expert Panel for the nomenclature and development of guidelines for treatment of allergies using recombinant allergens.
- 1990: Member, International Committee on Genetics of Asthma Study,
- 1990-92: Member, International Collaborative Study on HLA Association of Allergies,
- 1989: Member, International Committee-at-large for Allergen Nomenclature,

***Chair/Moderator, Scientific sessions:***

- 2006: Co-Moderator, Advanced Seminar on "Nanotechnology and applications to Allergy and Asthma" American Academy of Allergy, Asthma and Immunology, Miami, FL , March , 2006 (Invited).
- 2006: Co-organizer, NIPER-NANO-2006 Conference - Nanotechnology in Advanced Drug Delivery, National Institute Pharmaceutical Education and Research, Chandigarh, (<http://www.geocities.com/nanotechnologydrugdelivery>) India, Feb 17-18, 2006.
- 2005: Co-organizer, 8th International Congress on Emerging Technologies on drug and Gene-based Therapeutics, ([http://www.gtmb.org/2005\\_Conference/Program.pdf](http://www.gtmb.org/2005_Conference/Program.pdf).) Sept 3-10, 2005, Crete, Greece.
- 2002: Plenary lecturer in International RSV conference, Washington DC, June 2002
- 2002: Plenary lecturer in Symposium, American Academy of Allergy, Asthma and Immunology on "IFN- $\gamma$  Gene therapy Against Allergy and Asthma" New York, March, 2002.
- 2001: Plenary lecturer in Workshop, American Academy of Allergy, Asthma and Immunology on 'effects of adjuvants in Vaccines and allergies" New Orleans, 2001.
- 2001: Moderator, Breakfast Seminar, American Academy of Allergy, Asthma and Immunology on IL-4 Receptor and immunomodulation of atopic response" New Orleans, 2001.
- 2000: Moderator, Breakfast Seminar, American Academy of Allergy, Asthma and Immunology on IL-4 Receptor and immunomodulation of allergic response" San Diego, 2000.
- 1997: Moderator, American Academy of Allergy, Asthma and Immunology Mini Symp. on "Allergen Characterization", San Francisco.
- 1997: Moderator, American Academy of Allergy, Asthma and Immunology Mini Symp. on "Molecular Biology of Allergic Response", San Francisco,
- 1997: Moderator, Symposium on 'Allergy and Asthma in the Year 2000 and Beyond', University of South Florida.
- 1996: Moderator, AAAI advanced Seminar on "New therapies for allergic disease: Peptide immunotherapy.", 52 Ann.Meeting of AAAI, New Orleans.
- 1995: Moderator, AAAI advanced Seminar on "New therapies for allergic disease: Peptide immunotherapy and the induction of T cell anergy", 51 Ann. Meeting of AAAI, New York.
- 1994: Chair and organizer, Symposium on Molecular Characterization of aeroallergens,

- 5th Int. Symp. of Aerobiology, Bangalore.
- 1994: Chair, Scientific session of Allergenic cross-reactions. 15th Int. Congr. of Allergology and Clinical Immunology, Stockholm.
- 1994: Chair, International Symposium on immunopathology and immunomodulation of atopy and asthma, Winnipeg.
- 1992: Moderator, Advance Seminar on "T cell epitopes of allergens", American Academy of Allergy and Immunology.
- 1992: Chair, Scientific Session on Grass Pollen Allergens, Int. Symp. on Molecular Biology and Immunology of Allergens, Vienna,.
- 1991: Chair, Scientific Session on HLA and Allergy Workshop, San Francisco.

***Ad Hoc Reviewer for:***

***Grants:***

American Lung Association  
 American Heart Association  
 Member, NIH Study Section (SEP on Leadership for HIV/AIDS Clinical Trials Networks)  
 Member, NIH Study Section (SEP on NCI Nanotechnology Platforms)  
 Chairman of NIH Study Section (SEP on Signaling of the Immune System), 2004  
 Member, NIH Study Section (SEP on ancl Asthma and Allergic Diseases Research Centers: innate immunity, bioterrorism), 2003  
 NIH Study Section on AIDS and Vaccine Development, 1997-  
 VA Merit Review Application, JAH VA Hospital, 1997-  
 NATO collaborative grant, 1995-  
 NSF collaborative grant, 1995-  
 British Columbia Health Research Council Operating Grants, 1995-  
 Medical Research Council of Canada Operating and Scholarship grants, 1993-  
 Manitoba Health Research Council, Winnipeg, 1992-95  
 NSERC, Canada -Operating and Strategic Grants, 1991-96  
 NSERC, Canada- Independent Investigator Research Programs, 1991-96  
 National Asthma Campaign, London, England, 2001-  
 Asthma Foundation of Netherlands, Amsterdam, 2002-

***Manuscripts:***

Genetic Vaccines and Therapy, Editor-in –Chief, 2003-  
 Clinical and Molecular allergy, 2004 (Assoc Editor)  
 Journal of Allergy and Clinical Immunology, 1998-  
 American Medical association Asthma Web, 1997-  
 Biodrugs, 1997  
 Immunology Today, 1996-  
 Journal of Clinical Investigations, 1996-  
 International Journal of Cancer, 1993-  
 Allergy, 1993  
 Journal of Immunology, 1992-  
 Journal International Archives of Allergy and Immunology, 1991-  
 Journal of Cellular and Molecular Biochemistry, 1989

Vaccine  
 American J Crit Care Medicine  
 Gene Therapy  
 Molecular Therapy  
 Human gene therapy  
 European Respiratory Journal

**Thesis Examination:**

External Examiner, PhD thesis, Characterization of tropomyosin as the major allergen of Shrimp, by Ms K.N. Shanti, Indian Institute of Science, Bangalore, India, 1994.

External Examiner, PhD thesis, "Molecular Characterization of Dust mite allergens" by M. Dilworth, University of Western Australia, 1994.

Examiner, Ph.D. thesis, "Developmental and molecular characterization of allergen cognates in barley" by James Astwood, University of Manitoba 1993.

Examiner, Ph.D. thesis, "Down-regulation of antigen specific antibody responses by CDR3 peptides of antigen receptors of CD8 positive suppressor T cells" by Subhra Mohapatra, University of Manitoba. 1993.

Examiner M.Sc. thesis of Hui Wang, entitled "In vivo and in vitro study of murine cytokine gene expression via RNA and protein analysis", University of Manitoba. 1992

Examiner, Ph.D. thesis, "Characterization of ovalbumin-specific suppressor T cells and their suppressor factors induced by tolerogenic conjugates of ovalbumin and monomethoxy polyethylene glycol", by Youhai Chen, University of Manitoba. 1992

External Examiner, Ph.D. thesis "B cell epitope analysis of recombinant house dust Mite allergens" by W.K. Greene, University of Western Australia, Perth. 1991

**Professional Communications:**

**Plenary lecturer in important national/ international symposia:**

- 2006: Plenary Lecturer, Florida Association of Allergy, Asthma and Immunology, FL , June 2006 (Invited).
- 2006: Plenary Lecturer, Symposium on Nanoparticles and gene therapy, Congress on Particles, Orlando, FL, May 2006. (Invited).
- 2006: Lecturer, Workshop, American Academy of Allergy, Asthma and Immunology, Miami, FL, March, 2006 (Invited).
- 2006: Plenary Lecturer, NIPER-NANO-2006 Conference - Nanotechnology in Advanced

Drug Delivery, National Institute Pharmaceutical Education and Research, Chandigarh, (<http://www.geocities.com/nanotechnologydrugdelivery>) India, Feb 17-18, 2006 (invited).

- 2006: Plenary Lecturer: Pittsburg Annual International Lung symposium, October 9-12, 2005 (Invited).
- 2005: Plenary Lecturer: Annual Meeting of the American College of Chest Physicians, Montreal, Canada, October 29-Nov 3, 2005. (invited)
- 2005: Plenary lecturer in 8th International Congress on Gene and Drug Therapeutics, ([http://www.gtmb.org/2005\\_Conference/Program.pdf](http://www.gtmb.org/2005_Conference/Program.pdf).) Sept 3-10, 2005, Crete, Greece.
- 2005: Plenary lecturer in Workshop on "Benefits and harmfulness of infections in allergy and asthma, World allergy congress, Munich, 2005.
- 2002: Plenary lecturer in major Symposium of Annual Meeting of the American Academy of allergy, asthma and Immunology, New York, March, 2002.
- 2001: Plenary lecturer in major Symposium of Annual Meeting of the American Chest Physician's Foundation, Philladelphia, June, 2001.
- 2001: Plenary lecturer in major Symposium of International asthma Congress, Chicago, 2001.
- 2000: Plenary lecturer as external professor: Annual training Course for Pediatricians, Jalisco, Guadalajara, May 15-19, 2000.
- 2000: *Presentor* in Breakfast Seminar: 56th Annual Meeting of the American academy of Allergy Asthma and Immunology, San Diego, CA, March 2000 (invited)
- 1999: Plenary lecturer as external professor: 50<sup>th</sup> Annual Congress of the Indian College of Allergy and Immunology, Chandigarh, November 1999.
- 1999: Plenary lecturer as external professor: 53rd Mexican Congress of Allergy and Immunology, Porte Villarta, Mexico.
- 1998: Invited Speaker, International Congress of Immunology, Workshop on □ Allergens and allergic reactions□, New Delhi, October 1998.
- 1998: Plenary lecturer: XV Colombian Congress of Internal Medicine, Cartagena de Indias, October 08-11, 1998. Topics: Application of molecular biology to allergic disease, and Animal models of Asthma.
- 1998: Plenary lecturer as external professor: 52nd Mexican Congress of Allergy and

Immunology, Zacatecas, Mexico.

Topics: The nature versus nurture: Spotlight on asthma

DNA Vaccine: Applications in allergy and asthma

RSV infection and asthma: is there a link?

- 1998: Plenary lecturer as external professor: VII Workshop on Advances in Clinical Immunology and Allergy, Topic: "Advances in treatment of asthma" Mexico city.
- 1997: 53<sup>rd</sup> American Academy of Allergy, Asthma and Immunology Mini Symp. on "Allergen Characterization", San Francisco.
- 1997: 53<sup>rd</sup> American Academy of Allergy, Asthma and Immunology Mini Symp. on "Molecular Biology of Allergic Response", San Francisco,
- 1997: Symposium on "Allergy, Asthma and Clinical Immunology in the Year 2000 and Beyond", University of South Florida.
- 1996: American Academy of Allergy, Asthma and Immunology Advanced Seminar on "New therapies for allergic disease: Peptide immunotherapy.", 52 Ann. Meeting of AAAI, New Orleans.
- 1995: 50th Mexican Society of Allergy and Immunology, Guadalajara, Mexico, October 1995. Topic: Role of adhesion molecules in allergy and asthma.
- 1995: Interasthma-95, Guadalajara, Mexico, October 1995. Symposium on Immunotherapy, Topic: Basic aspects of specific Immunotherapy
- 1995: North Central Allergy Conference, Minneapolis, U.S.A. Topic: Advances in Peptide Immunotherapy: potential and implications
- 1994: 15th International Congress of Allergology and Clinical Immunology and European Academy Of Allergology and Clinical Immunology, Stockholm June 1994. "Meet the Professor Luncheon Seminar" with Prof. D. Kraft. Topic: "treatment of allergies with peptides: the future?"
- 1994: 15th International Congress of Allergology and Clinical Immunology and European Academy Of Allergology and Clinical Immunology, Stockholm June 1994. "Symposium on Basic Allergy: IgE regulation and therapy". Topic: "Therapy of IgE mediated reaction with recombinant allergens and epitopes".
- 1994: 5th International Congress of Aerobiology and Health, Bangalore (India) August 1994.  
Topic : "Treatment of pollen allergies and asthma with recombinant allergens and peptides".
- 1994: International Asthma Symposium, Winnipeg, April 8-9, 1994 "Peptide

## Immunotherapy: Principles and Potential"

- 1994: 49th Mexican Society of Allergy and Immunology, Manzanillo, Mexico, October 1994. Topics: Genetics and regulation of IgE response, Immunotherapy: past, present and future and participant in Round Table discussions on "Controversies on immunotherapy".
- 1994: Second Annual Congress of British Society of Immunology Meeting, Harrogate, December, 1994 topic: "Downregulation of specific Immune responses with TCR peptides vaccination."
- 1993: International Symposium on Molecular Biology and Immunology of Allergens, February 1993, Vienna. "Intra- and inter-species cross-reactivities among pollen allergens".
- 1993: Fourth International Allergy 2000 Symposium (by Schering-Plough International): "Role of T cells and T cell cytokines in allergic disorders", Vienna, December, 1993.
- 1993: 3rd International Workshop on Suppression, La Jolla, CA, June 1993. Topic: Downregulation of antigen-specific Immune responses with TCR peptides".
- 1993: International Symposium on Recent Advances in Allergology and Clinical Immunology, Taiwan, May 1993.
- 1993: International Symposium Workshop on "Molecular and cellular basis of allergy and autoimmunity" held in Bangalore under the aegis of the 19th Annual Congress of the Indian society of Immunology, January, 1993 (declined)
- 1992: Seventh International Symposium on Immunobiology of Proteins and Peptides, "Recombinant allergens and their potential use in immunotherapy", Lake Louis, Canada, October 1-5, 1992
- 1992: Gatlinburg Symposium, June 1992, Knoxville, Tennessee. "Molecular characterization of a novel abscisic acid responsive gene family".
- 1992: Nineteenth Annual Symposium of the Collegium Internationale Allergologicum. May 1992, Capri, Italy. "Therapeutic potential of recombinant allergens".
- 1992: Moderator and Speaker, American Academy of Allergy and Immunology, March 1992, Orlando, Florida. "T cell epitopes of allergens".

***Other Selected Speaking Invitations (Mini symposia, workshops etc):***

- Workshop on MAPKs, ATS Meeting, 2000, Toronto, April 5-10, 2000.
- Workshop on regulation of IgE response. 51st Amer. Acad. Allergy and Immunol., New



York, 1995. "Inheritance of IgE Immune responsiveness in mice".

- Workshop on Immunotherapy of allergic diseases. 8th Int. Congress of Immunology, San Francisco, July 1995. "Recombinant allergens and peptides: implications in immunotherapy".
- Workshop on allergens and allergy. 8th Int. Congr. Immunology, San Francisco, July 1995. "Failure to induce IgE antibody in SJL mice is not due to a defect in IL-4 production".
- Workshop on "aeroallergens", 50th American academy of Allergy and immunology, Annaheim, 1994. "identification of a novel highly cross-reactive allergen of plant pollens"
- Workshop on "Cytokines in allergic inflammation", 50th American academy of Allergy and Immunology, Chicago, 1993. " Differential expression of IL-2, IL-4 and IFN- after primary sensitization with allergens".
- Mohapatra, S.S., Mohapatra,S., Chen, Y., Takata, M. and Sehon, A.H. (1992) Predominant use of particular chains of TCR in suppressor T cell clones induced by tolerogenic Ag-mPEG conjugates of diverse specificities. Abstracts 8th Int. Congr. Immunol. #90-26, p.555.
- Mohapatra, S., Y. Chen, M. Takata, S.S. Mohapatra and A.H. Sehon (1992) A unique family of V genes encode TCR chains of cloned suppressor T (Ts) cells, induced by tolerogenic Ag(mPEG)<sub>n</sub> conjugates. FASEB J. 6:A1140.
- Chen, Y., S. Mohapatra, S.S. Mohapatra and A.H. Sehon (1992) Cytokine gene expression of cloned CD8<sup>+</sup> suppressor T (Ts) cells. FASEB J. 6:A1416.
- Zhang, L., Sehon, A.H. and Mohapatra, S.S. (1992) Antigen- and isotype-specific antibody responses to a recombinant antigen-allergen chimeric (RAAC) protein. J. Allergy Clin. Immunol. 89:321.
- Yang, M., Olsen, E. and Mohapatra, S. (1992) IgE and IgG antibody reactivities to a major Kentucky Bluegrass allergen Poa p IX. J.Allergy Clin. Immunol. 89: 319.
- Ansari, A.A., Alexander, E. L., Plitt, J.R. and Mohapatra, S.S. (1992) PCR analysis of the MHC class II associated invariant chain for structural and expression studies in Diabetes mellitus and other autoimmune diseases.J. Allergy Clin. Immunol. 89:255.
- Glaxo Workshop on HLA and Allergy Association Study, San Francisco, 1991."HLA-D typing by rDNA technology".
- Workshop on "Pollen Allergy". XIV Int. Congr. Allergol. Clin. Immunol., Kyoto, 1991. "T cell cross-reactivity among grass pollen allergens (GPA): Characterization GPA-specific T cell clones".

- Workshop on "Pollen Allergy", XIV Int. Congr. Allergol. Clin. Immunol., Kyoto, 1991. "The major epitopes of Poa pratensis IX allergens are localized on a conserved carboxy-terminal region".
- Workshop on "Modulation", XIV Int. Congr. Allergol. Clin. Immunol., Kyoto, 1991. "Molecular characterization of T cell receptors (TCR) of antigen-specific cloned suppressor T (Ts) cells".
- Workshop on "Pollen Allergy" XIV Int. Congr. Allergol. Clin. Immunol., Kyoto, 1991. "Development of a peptide expression strategy for the determination of epitopes on allergens".
- Workshop on "immunomodulation", 11th Int. Histocompatibility Workshop and Conference, Yokohama, 1991. "T cell receptor gene usage of antigen-specific cloned suppressor T (Ts) cells". (unable to attend due to unavoidable circumstances)
- Joint Workshop on HLA and Allergy Association Studies and the Allergen Database (ALBE), Johns Hopkins Asthma and Allergy Center, Baltimore, 1990. "TCR V genes".

#### **Research Seminars and Invited Guest Lectures:**

*Institute of Molecular Medicine, San Diego, 2005 (Invited)*

*Galenea Corporation, MA, 2005*

*Boehringer Ingelheim, CT, 2000*

*Curagen Inc, CT, 2000*

*Pasteur Institute, Paris, 1999.*

*European Molecular Biology Organization, Heidelberg, 1999.*

*University of Bielefeld-Institute of Genetics, Bielefeld, 1999.*

*Johns Hopkins Asthma and Allergy Center, Baltimore, 1998.*

*University of South Florida & All Children's Hospital Division of Pediatrics, 1998*

*University of South Florida & Tampa General VA Hospital Noon Conference, 1997*

*University of South Florida & VA Hospital Noon Conference, 1997*

*University of South Florida & All Children's Hospital Division of Pediatrics, 1997*

*University of South Florida, Department of Internal Medicine grand Round, 1996*

*Bristol Myer Squibb Pharmaceutical Research Institute, Seattle, 1996*

*Australian National University, John Curtin School of Medical Research, 1996*

*University of Sydney, Westmead Hospital, Institute of Immunology and Allergy Research, 1996*

*University of South Florida, Division of Allergy and Immunology, 1996*

*Research Round, Department of Pediatrics and Child Health, University of Manitoba, 1996*

*University of Montreal , Montreal, 1995*

*University of Sheffield, Sheffield, UK, 1994*

*Department of Animal Science, Univ. of Manitoba, 1994*

*Department of Human Genetics, Univ. of Manitoba, 1994*

*National Institute of Immunology, New Delhi, 1994*

*Guy's Hospital, London, England, 1993*

La Jolla Institute for Allergy and Immunology, La Jolla, CA, 1993  
 Max-Planck Institute for Immunobiology, Freiberg, Germany, 1993.  
 Department of Pathobiology, University of Minnesota, St Paul Campus, August 1993.  
 Department of Allergy and clinical Immunology, University of Minnesota, August 1993.  
 Department of Genetics, University of Bielefeld, 1992.  
 Johns Hopkins Asthma and Allergy Center, 1992.  
 University of Florence, Italy, Division of Allergology and Clinical Immunology, 1992.  
 International Institute of Genetics and Biophysics, Naples, Italy, May 8, 1992.  
 Pharmacia Allergy Research Foundation Award Lecture, In: XVth European Congress of Allergology and Clinical Immunology, Paris May 9-15, 1992.  
 Lofarma Allergeni, Milano, Italy, 1992.  
 Connaught Center for Biotechnology Research, Toronto, 1992.  
 Department of Microbiology and Immunology, University of Calgary, October 1992.  
 Department of Chemistry, University of Manitoba, November 1992.  
 Mayo Clinic, Department of Immunology, Rochester, USA, 1992.  
 Department of Biochemistry and Molecular Biology, University of Manitoba, 1991.  
 ImmuLogic Corporation, Boston, 1991.  
 Indian Institute of Science, Bangalore, India, 1991.  
 Department of Botany, University of Toronto, 1990.

*b) Research related:*

*Students supervised/co-supervised:*

- |      |                         |                  |
|------|-------------------------|------------------|
| i)   | Ph.D. Students          |                  |
|      | Lei Zhang, M.D.         | Ph.D. 1992       |
|      | Youhai Chen, M.D.       | Ph.D. 1992       |
|      | Subhra Mohapatra, M.Sc. | Ph.D. 1993       |
|      | Egil Olsen              | Ph.D. 1994       |
|      | (University of Oslo)    |                  |
|      | & Univ. of Manitoba)    |                  |
|      | Gangur Venugopal, MVsc  | Ph.D. 1996       |
| ii)  | M.Sc. Students          |                  |
|      | Ming Yang, M.D.         | M.Sc., 1992      |
|      | Hui Wang, M.D.          | M.Sc., 1991      |
|      | Cao Yanna               | M.Sc., 1996      |
| iii) | B.Sc. Med Student       |                  |
|      | Peter R. Clark          | B.Sc. (Med) 1990 |
|      | Allon Davis             | B.Sc. (Med) 1994 |
| (iv) | Summer Students         |                  |
|      | Brendan McClarty        | 1995             |
|      | Cynthia Tai             | 1990             |

- v) *Post-doctoral Fellows/Research Associates supervised*
- |                                 |                      |         |
|---------------------------------|----------------------|---------|
| Andre Silvanovich, M.Sc.        | Research Associate   | 1989-91 |
| Egil Olsen,<br>(with MRC Group) | Research Associate   | 1989-91 |
| Ma Luo, Ph.D.                   | Post-doctoral Fellow | 1990-92 |
| Research Associate              | 1993-94              |         |
| Arvinda Kasyap, Ph.D.           | Post-doctoral Fellow | 1992    |
| Ming Yang, MD                   | Research Assoc.      | 1994-96 |
- (vi) *Visiting Scientists*
- |                       |  |         |
|-----------------------|--|---------|
| Dr. R. Shu, Ph.D.,    | Beijing Acad of Science                                | 1991    |
| Dr. Yanyun Wang, M.D. | Dept. of Internal Medicine,<br>Shanxi Cancer Hospital. | 1991-93 |
- (vii) *Technicians*
- |                      |                 |         |
|----------------------|-----------------|---------|
| Andre Hamel, M.Sc.   | Technician III, | 1989-90 |
| Lin Lihua, B.Pharm.  | Technician III, | 1990-92 |
| Darcy Lyn Salo Dipl. | Technician III, | 1992-95 |
| Judy Cornell         | Technician,     | 1995-96 |
- (viii) *Graduate Student Advisory Committee:*
- |                                    |         |
|------------------------------------|---------|
| Umu Anzala, Ph.D. Candidate,       | 1992-95 |
| Department of Medical Microbiology |         |

## II. University of South Florida (6/1996-present)

### *Research Supervision:*

Demitri Theodoropoulos, MD, Clinical Research Fellow, on the project "Detection of respiratory syncytia virus in sputum"

Giana N-Kasti, MD, Clinical Research Fellow, on the project "Effect of dexamethazone on epithelial cells."

Kevin Rosenbach, MD, Clinical Research Fellow, on the project "Mechanism of aspirin-induced asthma."

Mukesh Kumar, PhD, Post doctoral training Fellow, on the project "Development DNA Vaccines."

Aruna K Behera, PhD, Post-doctoral Fellow, On the project "Molecular changes in Epithelial cells following infection with respiratory syncytial virus."

Xiang Hu, MD on the project "Identification of genes associated with differential predisposition to IgE immune responsiveness"

Hiroto Matsuse, MD, PhD Post doctoral Fellow, on the project "Adjuvant role of IL12 as a vaccine adjuvant"

Gary Hellerman, PhD, Post-doctoral Fellow on the project, Role of IL-9 receptor in asthma.

Geoff Patton, PhD, Instructor, on Development of Animal Model of RSV infection.

Dan Reichmuth, MD, Clin Res Fellow, on " genetic basis of asthma"

Weidong Zhang, MD, Post-doc, siRNA inhibition of Dengue virus infection and respiratory syncytial virus infection

PK Jena, PhD, Research Instructor, Regulation of ANP gene expression

Dong-won Lee, PhD , Post-doc, Chitosan nanoparticles and gene transfer

Arun Kumar, PhD, Research associate, nanotechnology and diagnostic applications

Biswabhusan sahuo, PhD, Post-doc, Chemical synthesis of polymeric nanoparticles

Shawna Shirley, (PhD Candidate) Inducible gene expression systems in mice

Alison Jones (PhD Candidate) Cigarette smoke inducible gene expression in human epithelial cells

### **Teaching:**

2002, 2005: *Lecturer and Coordinator of course on "Clinical Research Methods"*

2001: *Co-ordinated lecture series on " Molecular Medicine", College of Medicine*

1997-2001: Fellows and residents at the Division of Allergy and immunology and in Internal Medicine in relation to basic immunology, molecular biology and genetics.  
College of Medicine Honours Program

USF Summer student training program

Coordinator of the VA Research seminars sponsored by the Division of Allergy and Immunology, 1997-05.

Coordinator of the work-in progress seminars for the research (since 1996-)

Coordinator of the "Forum in Molecular Medicine" for the Department of Internal Medicine Grand Rounds, and Molecular Medicine: Bench to Bedside. 1998, 1999

Coordinator of the Airway Disease Research Center Seminars, 1998-04.

***Administration:***

Member of Faculty Senate, 1998-99

Member of Faculty Senate Committee on Convocation and Awards, 1999-present

Member of Committees on Committee, College of Medicine, 1999-present

Director of Basic Research, Joy McCann Culverhouse Airway Disease Center, 1999-present

Member of Research and Development Committee, VA Hospital 2004-present

**Ongoing Research Support:**

1. RO1 HL71101-01A2 (Mohapatra:PI) Oct. 2003-Sept. 2007. NHLBI  
Chitosan IFN- $\gamma$ -pDNA  
Nanosphere Therapy and Immunopathology of Allergic Asthma.  
 To investigate the potential and mechanism of chitosan-IFN $\gamma$  DNA nanospheres in the treatment of allergic asthma.
2. R41 HL 0769-964-01 (Mohapatra:PI) Sept. 2004-April 2005 NHLBI  
Chliposome Nanoparticle Prophylactics  
for Allergic Asthma  
 The goal is to examine the potential of nanoparticles for the treatment of asthma.
3. R41 HL0782-298-01 (Mohapatra:PI) Sept. 2004-April 2005 NHLBI  
Chlipoplex Nanoparticle Prophylactics  
for RSV Infection  
 The goal is to examine the potential of nanoparticles for the treatment of RSV infection.
4. Glaxo SmithKline (Mohapatra: PI) Dec. 2004-Nov.2005 Glaxo SmithKline  
Mechanism of fluticasone propionate and salmeterol combination therapy in a 3-D human epithelial cell culture model  
 The primary goal of this study is to examine the efficacy and mechanism of combined therapy using beta-2 agonists and steroids in virus-induced asthma exacerbation in a 3-D epithelial cell culture model.
5. GlaxoSmithKline (Mohapatra: PI) Feb. 2005-Jan. 2006 GlaxoSmithKline  
Efficacy and safety of intranasal fluticasone propionate and salmeterol in a rat model of allergen and virus-induced asthma  
 The primary goal of this study is to examine the efficacy and safety of a combined therapy using a corticosteroid and  $\beta$ -2 agonist in virus-induced asthma exacerbation in a rodent model of allergen- and RSV-induced asthma.
6. NIH-Pediatric Clinical Research Center (Mohapatra: PI) Feb. 2005-Jan. 2006 Development Grant All Children's Hospital  
Role of Natriuretic Peptide-Cascade in the Genesis and Control of Asthma  
 The primary goal of this study is to investigate the role of natriuretic peptides in the development of allergic rhinitis and asthma in children and adolescents.
7. VA Merit Review Award (Mohapatra: PI) April 2005-March 2009 James A. Haley VA Hospital  
SiRNA-based Prophylactics for Respiratory Syncytial Virus Infection  
 The primary goal of the study is to investigate SiRNA-based prophylactics for RSV infection based on NS<sub>1</sub> and NS<sub>2</sub> genes.

**PUBLICATIONS: (selected list)****Refereed Publications:**

Mohapatra, S.S., Hill, R., Astwood, J., Ekramoddoullah, A.K.M., Olsen, E., Silvanovich, A., Hatton, T., Kisil, F.T. and Sehon, A.H. Isolation and characterization of a cDNA clone encoding an IgE binding protein from Kentucky Bluegrass (*Poa pratensis*) pollen. *Int. Arch. Allergy Appl. Immunol.* 91:362. 1990.

Mohapatra, S.S., Hill, R.D. and Sehon, A.H. Molecular cloning of allergens: progress and perspectives. *Aerobiologia* 6: 205. 1990.

Zhang, L., Kisil, F.T., Sehon, A.H. and Mohapatra, S.S. Allergenic and antigenic cross-reactivities of Group IX grass pollen allergens. *Int. Arch. Allergy Appl. Immunol.* 96:28. 1991.

Luo, M., Lihua, L., Hill, R.D. and Mohapatra, S.S. The primary structure of an environmental stress and abscisic acid inducible protein of alfalfa. *Plant Mol. Biol.* 17:1267. 1991.

Olsen, E., Zhang, L., Hill, R.D., Kisil, F.T., Sehon, A.H. and Mohapatra, S.S. Identification and characterization of the Poa p IX Group of basic allergens of Kentucky Bluegrass pollen. *J. Immunol.* 147:205. 1991. ("Outstanding" citation by Clinical Allergy Digest)

Yang, M., Olsen, E., Dolovich, J., Sehon, A. and Mohapatra, S. Immunologic characterization of a recombinant Kentucky Bluegrass (*Poa pratensis*) allergenic peptide. *J. Allergy Clin. Immunol.* 87:1096. 1991. ("Outstanding" citation by inical Allergy Digest)

Silvanovich, A., Astwood, J., Zhang, L., Olsen, E., Kisil, F., Sehon, A., Mohapatra, S.S. and Hill, R.D. Nucleotide sequence analysis of three cDNAs coding for Poa p IX isoallergens of Kentucky bluegrass pollen. *J. Biol. Chem.* 266:1204. 1991.

Zhang, L., Olsen, E., Hill, R., Kisil, F., Sehon, A. and Mohapatra, S.S. Mapping of B cell epitopes of a recombinant Poa p IX allergen of Kentucky Bluegrass pollen. *Mol. Immunol.* 29: 1383. 1992.

Luo, M., Liu, J.H., Mohapatra, S., Hill, R.D. and Mohapatra, S.S. (1992). Structure and expression of a new gene family of alfalfa encoding environmental stress and abscisic acid inducible proteins. *J. Biol. Chem.* 267:15367. 1992.

Zhang, L., Sehon, A.H. and Mohapatra, S.S. Induction of IgE antibodies to recombinant allergens in mice. *Immunology* 76:158. 1992.

Mohapatra, S.S. Recombinant allergens and allergen standardization. *J. Allergy Clin. Immunol.* 89:921. 1992.

Baskar, S., Parronchi, P., Mohapatra, S. S., Romagnani, S. and Ansari, A.A. Human T cell responses to the purified pollen allergens of the grass, *Lolium perenne*: relationship between structural homology and T cell recognition. *J. Immunol.* 148:2378. 1992.



Olsen, E. and Mohapatra, S.S. Expression and thrombin cleavage of Poa p IX recombinant allergens fused to glutathione-s-transferase. ***Int. Arch. Allergy Immunol.*** 98:343.1992.

Wang, H., Mohapatra, S.S. and Hayglass, K. Evidence for the existence of IL-4 and IFN- $\gamma$  producing T cells in the naive T cell repertoire. ***Immunol. Lett.*** 31:169.1992.

Mohapatra, S.S. and Sehon, A.H. Therapeutic potential of recombinant allergens. ***Int. Arch Allergy Immunol.*** 98: 265. 1992.

Venugopal, G., Mohapatra, S., Salo, D. and Mohapatra, S.S. Multiple mismatch annealing: basis for random amplified polymorphic DNA fingerprinting. ***Biochem. Biophys. Res. Comm.*** 197:1382.1993.

Zhang, L. and Mohapatra, S.S. Antigen- and isotype-specific immune responses to a recombinant antigen-allergen chimeric (RAAC) protein. ***J. Immunol.*** 151:791. 1993.

Mohapatra, S., Chen, Y., Takata, M., Mohapatra, S.S. and Sehon, A.H. Analysis of TCR  $\alpha$  and  $\beta$  chains in cloned suppressor T cells of diverse specificities: Implication of CDR3 in antigen recognition. ***J. Immunology*** 151:688. 1993.

Chen, Y., Mohapatra, S., Mohapatra, S. S. and Sehon, A.H. Cytokine gene expression of the CD8+suppressor T cells. ***Cell. Immunology*** 149:409. 1993.

Chen, Y., Maiti, P.K., Masaru, T., Mohapatra, S., Mohapatra, S.S. and Sehon, A.H. The suppressor factor of T suppressor cells induced by tolerogenic conjugates of ovalbumin and monomethoxy polyethylene glycol is serologically and physicochemically related to the heterodimer of T cell receptor. ***J. Immunology*** 152:3. 1994.

Mohapatra, S.S., Mohapatra, S. Yang, M., Ansari, A.A., Parronchi, P., Maggi, E. and Romagnani, S. Molecular basis of cross-reactivity among allergen-specific human T cells: T cell receptor gene usage and epitope structure. ***Immunology*** 81:15. 1994.

Olsen, E. and Mohapatra, S.S. Recombinant allergens and diagnosis of grass pollen allergies. ***Ann. Allergy*** 72:499, 1994.

Mohapatra, S.S. Modulation of allergen-specific responses by T cell based peptide vaccines. ***Clin. Rev. Allergy*** 12:3, 1994.

Venugopal, G., Trivedi, H.N. and Mohapatra, S.S. Arbitrary single short primers identify polymorphic markers that distinguish inbred strains of mice. ***Biochem. Biophys. Res. Comm.*** 203:659, 1994.

Mohapatra, S.S. Determinant spreading: implications for vaccine design of atopic disorders. ***Immunol. Today*** (Letter) 15: 596, 1994.

Mohapatra, S.S., Nicodemus C.F., Schou C and Valenta R. Recombinant allergens and epitopes. ***Allergy & Clin. Immunol. News*** 6:45, 1994.

Astwood, J., Mohapatra, S.S., Ni, H., Hill, R.D. Barley allergen homologous protein in crop plants. ***Clin. Exp. Allergy*** 25: 66, 1995.

Mohapatra, S. S. IL-12: possibilities . ***Science*** (Letter) 269:1499, 1995.

Mohapatra, S.S. Prevention rather than cure of allergies and asthma in twenty first century? ***Allergia*** 42:18, 1995.

Olsen, E., Fallung, A. and Mohapatra, S. S. Characterization of IgE and IgG antibody responses to grass pollen allergens in non-atopic and atopic individuals. ***Allergy*** 50:734, 1995.

Venugopal, G., Yang, M., Luo, Z., Salo, D., Chang, M. and Mohapatra S.S. Analysis of Tcr $\alpha$ 8, II4 and Ifg as genetic predisposition factors for atopic IgE responsiveness in a murine model. ***J Immunology***. 155:5463, 1995.

Zhang, L., Yang, M., Chong, P. and Mohapatra, S.S. B- and T- cell epitopes of a Poa p IX allergen rKBG60 using synthetic peptides. ***Immunology***. 87:283, 1996.

Parronchi, P., Mohapatra, S., Manetti, R., Chong, P., Mohapatra, S.S., Maggi, E., Renz, H. and Romagnani, S. Modulation by IFN  $\alpha$  of cytokine profile and epitope specificity of allergen-specific T cells. ***Eur. J Immunology***. 26:697, 1996.

Yang, M., Wang, Y., Zhang, L., Chong P. and Mohapatra S.S. Host genetic and adjuvant factors influence antibody fine specificity to a major recombinant grass allergen. ***Int Arch Allergy and Immunol***. 111:173, 1996.

Mohapatra, S. S. and Mohapatra S. Application of Molecular Biology to diagnosis and treatment of allergic diseases. ***Immunology and Allergy Clinics of North America***, Co., 16:591, 1996.

Mohapatra, S.S. An integrated approach to immune deviation and prevention of allergies and asthma. ***Allergy Clin Immunol International***, 8:164, 1996.

Cao, Y., Luo, Z., Yang, M. and Mohapatra, S.S. Vaccination with a multi-epitopic recombinant allergen (MERA) vaccine induces specific immune deviation via T cell anergy. ***Immunology***, 90:46, 1997.

Mohapatra, S.S. Is cross-reactivity a real or an imaginary concept? (Correspondence) ***J Allergy Clin Immunol*** 99:724 , 1997.

Tao, F., Yang, M., Halayko, A. Mohapatra, S.S. and Stephens, N.L. Airway hyperresponsiveness differ in two inbred strains of mouse disparate in IgE and IL-4 production. ***Am J Respir Cell Mol Biol***, 17:156, 1997. (With a Perspective).

Behera A.K., Kumar M., Matsuse M., Lockey, R.F. and Mohapatra, S.S. Respiratory syncytial virus induces the expression of 5-lipoxygenase and endothelin-1 in bronchial epithelial cells.

**Biochem Biophys Res Comm** 251:704-709, 1998.

Yang M, Cao, Y and Mohapatra, S.S. CD8 T cells inhibit IgE synthesis in low responder SJL mice. **Immunology**, 43:237, 1998.

Kumar M., Behera, A., Matsuse H., Lockey, R.F. and Mohapatra, S.S. A recombinant BCG vaccine generates a Th-1 like response and inhibits IgE synthesis in BALB/c mice. **Immunology** 97 (3), 515-521, 1999.

Kumar M, Behera A, Matsuse H, Lockey R, Mohapatra SS. Intranasal IFN-g transfer of prevents respiratory syncytial virus infection in BALB/c mice. **Vaccine** 18:558, 1999.

Liu, J.-H., M. Luo, K.-J. Cheng, S. S. Mohapatra and H. D. Hill. Identification and characterization of a novel barley gene that is ABA-inducible and expressed specifically in embryo and aleurone. **J. Exp. Bot.** 50: 727-728, 1999.

Lockey RF, Mohapatra S.S. The search for clues to wheeze, itch, sneeze and cough. **Inquiry**. 2: 1-2, 1999.

Burne M, Haq M, Matsuse H, Mohapatra SS, Rabb H. Genetic susceptibility to renal ischemia reperfusion injury revealed in a murine model. **Transplantation**; 69: 1023-25, 2000.

Mohapatra S.S. What is 'hot' in asthma therapeutics (AAAAI-Report) **Investigational Drugs**. 12: 56-58, 22 Mar 2000.

Mohapatra S.S., San Juan H. Novel Immunotherapeutic approaches for the treatment of allergic diseases. **Immunology and Allergy Clinics of North America**. 20(3): 9-1, 2000.

Mohapatra S.S. Advances in genetics of lung diseases-an update (meeting report). **Investigational Drugs**. 21: 46-49, 24 May 2000.

Matsuse H, Kumar M, Behera A, Lockey F, Mohapatra SS. Differential cytokine mRNA expression in dermatophagoides farinae allergen sensitized and respiratory syncytial virus infected mice. **Microbe and Infection** 2: 1, 2000.

Matsuse H., Behera A, Kumar M, Rabb H, Lockey R, Mohapatra S.S. Recurrent respiratory syncytial virus infection in allergen-sensitized mice leads to persistent airway inflammation and airway hyperresponsiveness. **Journal of Immunology**. 164:6583-92, 2000.

Behera, A., Matsuse H., Kumar M., Kong X., Lockey R.F. and Mohapatra S.S. Blocking Intercellular Adhesion Molecule-1 on Human Epithelial Cells Decreases Respiratory Syncytial Virus Infection. **Biochem Biophys Res Commun** 280:188-195, 2001.

Mohapatra S.S. Meetings Report. Allergology and Clinical immunology-XVII International Congress. **IDdrugs**, 4:35-37, 2001.

Mohapatra S. S. and R. F. Lockey. Molecular characteristics of Allergens, **Clin Rev in Allergy** 21(2-3):203-13, 2001.

Mohapatra, S.S. and Lockey, R.F. Allergens. In: **Current Review of Allergic Diseases**. Ed. M Kaliner, Current Medicine Inc, PA, pp-51-60, 2001 (2<sup>nd</sup> edition).

Lockey, R.F and Mohapatra SS (as part The American Lung Association Asthma Clinical Research Centers). The safety of inactivated influenza vaccine in adults and children with asthma. **The New England Journal of Medicine**. 345:1529, 2001.

Kumar M., Behera A. K, Lockey, R.F. and Mohapatra, S.S. IFN- $\gamma$  and IL-12 plasmid DNAs as vaccine adjuvants in a murine model of grass allergy. **J Allergy Clin Immunol** 108:402, 2001.

Mohapatra S.S. Gene transfer and transcription factors. Meetings Report. American Academy of allergy, Asthma and Immunology, New York, 2002, **IDrugs**, 5:312-315, 2002.

Behera AK, Kumar M, Lockey RF, Mohapatra SS. 2'-5' Oligoadenylate synthetase plays a critical role in interferon-gamma inhibition of respiratory syncytial virus infection of human epithelial cells. **J Biol Chem** 277:25601-8, 2002.

Kumar, M, Behera AK, Lockey RF, Zhang J, Perez de la Cruz C, Chen I, Leong KW, Huang S-K and Mohapatra SS. Intranasal Gene transfer by Chitosan-DNA Nanospheres Protects BALB/C Mice Against Acute Respiratory Syncytial Virus Infection. **Human Gene Therapy**. 13:1415-25, 2002.

Hellermann GR, Nagy SB, Kong X, Lockey RF, Mohapatra SS. Mechanism of Cigarette Smoke Condensate-induced Acute Inflammatory Response in Human Bronchial Epithelial cells. **Resp. Res.** 3:22-30, 2002.

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